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358—(Revised.)

United States Department of Agriculture,

OFFICE OF EXPERIMENT STATIONS,

A. C. TRUE, Director.

Irrigation Investigations, Elwood Mead, Expert in Charge.

LIST OF PUBLICATIONS OF THE OFFICE OF EXPERIMENT STATIONS ON IRRIGATION.

FOR GRATUITOUS DISTRIBUTION.

(Requests for these publications should be sent to the Secretary of Agriculture or to a Senator or Representative in Congress.)

Farmers' Bulletin No. 46.—Irrigation in Humid Climates. By F. H. King, Professor of Agricultural Physics, College of Agriculture, University of Wisconsin, and Physicist of the Wisconsin Agricultural Experiment Station. Pp. 27, figs. 4.

Treats of the advantages of an abundant supply of soil moisture, the rainfall of the growing season in the United States, water as a plant food, the advantages and disadvantages of irrigation in humid climates, extent of irrigation in the humid parts of Europe, the rainfall of Europe and the Eastern United States, the character and antiquity of European irrigation, fertilizing value of irrigation waters, lines along which irrigation should first develop, land best suited to irrigation in humid climates, waters best suited to irrigation, amount of water needed for irrigation, methods of obtaining water for irrigation, the construction of reservoirs, and methods of applying water.

Farmers' Bulletin No. 116.—Irrigation in Fruit Growing. By E. J. Wickson, M. A., Professor of Agricultural Practice, University of California, and Horticulturist of the California Experiment Station. Pp. 48, figs. 8.

A statement of the relations of irrigation to fruit production, and of irrigation methods, as they have been demonstrated by Pacific coast experience.

Farmers' Bulletin No. 138.—Irrigation in Field and Garden. By E. J. Wickson, M. A. Pp. 40, figs. 18.

This bulletin discusses the irrigation of the field and garden from the standpoint of the individual farmer, and contains instructions on the determination of ditch levels, the measurement of small streams, sources of water supply and their use, including the diversion of water from streams, the development of water in dry creek beds, the development of springs, the collection of water from the sides of canyons and ravines, tunneling for water, flowing wells, pumping for irrigation, and the storage of storm water; the distribution of irrigation water, including the location of the farm ditch and the turning of water from ditches; methods of applying water, including flooding, the depressed bed, ditch-bank irrigation, furrow irrigation, raised-bed irrigation, subirrigation and underflow, and irrigation by sprinkling; the choice of an irrigation method; and the time for the application of water.

Rise and Future of Irrigation in the United States.—By Elwood Mead, Expert in Charge of Irrigation Investigations, Office of Experiment Stations. Pp. iii, 591-612, pls. 5. (Reprint from Yearbook, 1899.)

A popular discussion of this subject under the following heads: Remains of ancient irrigation works; early irrigation in California; beginnings of modern irrigation; cooperative colonies in Colorado and California; corporate canal

building and objections to such canals; water-right problems of the arid regions; the appearance and resources of the arid region; present and future of irrigation, including growth of irrigation and need of better laws, need of reform in the management of arid public land, influence of the range industries, uncertainty as to State and Federal jurisdiction, complications from lack of uniform water laws, methods and measures needed to develop the arid region, appropriation and distribution of the water supply, public supervision and control of irrigation, and influence of irrigation upon people and country; and the commercial importance of irrigation.

Practical Irrigation.—By C. T. Johnston and J. D. Stannard, Assistants in Irrigation Investigations, Office of Experiment Stations. Pp. 491-512, figs. 8. (Reprint from Yearbook, 1900.)

FOR SALE.

(To secure these publications, address the Superintendent of Documents, Union Building, Washington, D. C., inclosing price given. Remittances must be made by cash or United States postal order. Postage stamps and checks not accepted.)

Bulletin No. 36.—Notes on Irrigation in Connecticut and New Jersey. By C. S. Phelps, B. S., and Edward B. Voorhees, M. A. Pp. 64, figs. 7. Price 5 cents.

This bulletin discusses the need, methods, and history of irrigation in Connecticut, irrigation plants in use in Connecticut, experiments on the effects of irrigation on strawberries, and suggestions regarding irrigation; the need of irrigation in New Jersey, amount of water necessary, storage of water, seepage, cost of irrigation, areas capable of being watered by gravity, irrigation by pumping, irrigation by wells, warping, water meadows, total area irrigable, estimated cost of irrigation and suggestions for small plants, use of irrigation in New Jersey, possibility of pumping large quantities of water from wells for irrigating purposes, and irrigation experiments in New Jersey.

Bulletin No. 58.—Water Rights on the Missouri River and Its Tributaries, by Elwood Mead, State Engineer of Wyoming. With papers on the Water Laws of Colorado, by John E. Field, State Engineer; and of Nebraska, by J. M. Wilson, State Engineer. Pp. 80, maps 3, figs. 4. Price 10 cents.

A discussion of the irrigation laws which control the diversion and use of water from the Missouri River and its tributaries. The region covered in this discussion includes Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Wyoming, and the Northwest Territories of Canada.

Bulletin No. 60.—Abstract of Laws for Acquiring Titles to Water from the Missouri River and Its Tributaries, with the Legal Forms in Use. Compiled by Elwood Mead, State Engineer of Wyoming. Pp. 77. Price 10 cents.

Includes abstracts of laws and legal forms in use in Colorado, Kansas, Montana, Nebraska, South Dakota, Wyoming, and the Northwest Territories of Canada.

Bulletin No. 70.—Water-Right Problems of Bear River. By Clarence T. Johnston and Joseph A. Breckons. Pp. 40, pls. 9. Price 15 cents.

Presents some of the water-right complications of interstate streams as illustrated on Bear River. The bulletin discusses the water supply of the river and its diversion and the controversies which have arisen regarding water rights and the need of uniform laws.

Bulletin No. 73.—Irrigation in the Rocky Mountain States. By J. C. Ulrich. Pp. 64, pls. 10. Price 10 cents.

Explains the agricultural conditions prevailing and the methods of acquiring and using water for irrigation practiced in that portion of the arid region covered more particularly by the States of Colorado, Wyoming, Utah, Idaho, and Montana, in which the conditions and methods are somewhat similar.

Bulletin No. 81.—The Use of Water in Irrigation in Wyoming and Its Relation to the Ownership and Distribution of the Natural Supply. By B. C. Buffum, M. S., Professor of Agriculture and Horticulture, University of Wyoming, and Vice-Director of Wyoming Agricultural Experiment Station. Pp. 56, pls. 8. Price 10 cents.

This bulletin reports experiments on the duty of water for different crops in Wyoming, and discusses the application and measurement of water conditions affecting the duty and continuous flow as a basis of appropriation.

Bulletin No. 86.—The Use of Water in Irrigation. Report of Investigations made in 1899, under the supervision of Elwood Mead, Expert in Charge, and C. T. Johnston, Assistant. Including Reports by Special Agents and Observers W. M. Reed, W. H. Code, W. Irving, O. V. P. Stout, Thomas Berry, S. Fortier, R. C. Gemmell, G. L. Swendsen, and D. W. Ross. Pp. 253, pls. 50, figs. 18. Price 30 cents.

This bulletin explains the methods in use in the arid States in the distribution and use of water in irrigation. It gives a large number of measurements made to determine the duty of water and the losses by seepage and evaporation from canals, and discusses the methods by which the water supply may be more effectively and economically utilized in the production of crops.

Bulletin No. 87.—Irrigation in New Jersey. By Edward B. Voorhees, M. A., Director New Jersey Agricultural Experiment Stations and Professor of Agriculture, Rutgers College. Pp. 40, figs. 5. Price 5 cents.

Results of experiments conducted for the purpose of determining whether irrigation during short periods of drought in regions where the rainfall is usually sufficient for the maximum growth of crops will sufficiently increase the yield to pay for the works necessary to obtain the supply of water.

Bulletin No. 90.—Irrigation in Hawaii. By Walter Maxwell, Ph. D., Director and Chief Chemist, Hawaiian Experiment Station. Pp. 48, pls. 6, figs. 3. Price 10 cents.

Discusses the climatic, soil, and other conditions as affecting irrigation in Hawaii, and gives the results of irrigation experiments, especially with sugar cane, carried on by the author for a number of years.

Bulletin No. 92.—The Reservoir System of the Cache la Poudre Valley. By E. S. Nettleton. Pp. 48, pls. 14. Price 15 cents.

A description of the reservoir system of the Cache La Poudre Valley, showing the benefits to be derived from the construction of reservoirs for the storage of water for irrigation.

Bulletin No. 96.—Irrigation Laws of the Northwest Territories of Canada and Wyoming, with Discussions by J. S. Dennis, Deputy Commissioner of Public Works, Canada, and Fred Bond, State Engineer of Wyoming, and J. M. Wilson, Agent and Expert, Irrigation Investigations, Office of Experiment Stations. Pp. 90, frontispiece, pls. 5. Price 10 cents.

Texts of the irrigation laws of the Northwest Territories of Canada and Wyoming, with the regulations, forms, and methods of procedure adopted in the administration of these laws, and a discussion of the principles underlying the laws and the methods followed in their enforcement.

Bulletin No. 100.—Report of Irrigation Investigations in California under the direction of Elwood Mead, assisted by William E. Smythe, Marsden Manson, J. M. Wilson, Charles D. Marx, Frank Soulé, C. E. Grunsky, Edward M. Boggs, and James D. Schuyler. Pp. 411, pls. 29, figs. 16. Price \$2.85.

This report deals with investigations carried on during the summer of 1900 in cooperation with the California Water and Forest Association. In addition

to a review of the agricultural situation in the State, it presents a comprehensive discussion of the water laws and customs under which irrigation is practiced in California as typified by the conditions in Honey Lake Basin, and on Yuba River, Cache Creek, Salinas River, San Joaquin River, Kings River, Los Angeles River, Sweetwater River, and San Jacinto River. It describes the methods and means by which water is diverted from these streams and used in irrigation, and the indefinite and excessive appropriations of water and the resulting litigation, and discusses the evils resulting from absence of State control of streams.

SEPARATES.

The Use of Water in Irrigation. Discussion of Investigations. By Elwood Mead, Expert in Charge of Irrigation Investigations. **Computation of Discharge Records and Preparation of Diagrams.** By C. T. Johnston, Assistant in Irrigation Investigations. Pp. iv, 15-82, pls. 26, figs. 13. (Reprint, Office of Experiment Stations Bulletin No. 86.)

Use of Water for Irrigation in Texas. Use of Water in Irrigation in the Pecos Valley. By W. M. Reed, Chief Engineer of the Pecos Irrigation and Improvement Company. **Use of Water in Irrigation in Arizona.** By W. H. Code, Chief Engineer of the Consolidated Canal Company. **Duty of Water Under Gage Canal, Riverside, Cal.** By W. Irving, Chief Engineer, Gage Canal. Pp. iv, 83-148, pls. 19. (Reprint, Office of Experiment Stations Bulletin No. 86.)

Duty of Water in the Gallatin Valley. By Samuel Fortier, C. E., Professor of Irrigation Engineering, Montana College of Agriculture and Mechanic Arts. Pp. ii, 175-196, pls. 2, figs. 3. (Reprint, Office of Experiment Stations Bulletin No. 86.)

Duty of Water in Nebraska. By Special Agent O. V. P. Stout, Professor of Civil Engineering, University of Nebraska. **Duty of Water Under the Amity Canal.** By Special Agent Thomas Berry, Chief Engineer of the Great Plains Water Company. **Duty of Water in Wyoming.** By C. T. Johnston, Assistant in Irrigation Investigations. **Duty of Water in the Gallatin Valley.** By Samuel Fortier, Professor of Irrigation Engineering, Montana College of Agriculture and Mechanic Arts. **Duty of Water on Big Cottonwood Creek, Utah.** By Special Agent R. C. Gemmell, State Engineer of Utah. **Duty of Water Under the Logan and Richmond Canal.** By Special Agent George L. Swendsen, Professor of Civil Engineering, Agricultural College of Utah. **Duty of Water as Related to the Irrigation Problems of the Boise Valley, Idaho.** By Special Agent D. W. Ross, State Engineer of Idaho. Pp. iv, 149-248, pls. 28, figs. 5. (Reprint, Office of Experiment Stations Bulletin No. 86.)

The Agricultural Situation in California. By Elwood Mead, Irrigation Expert in Charge. Pp. iv, 17-69, 397-400, pls. 5. (Reprint, Office of Experiment Stations Bulletin No. 100.)

The Irrigation Problems of Honey Lake Basin, California. By William E. Smythe, Vice-President of the California Water and Forest Association. Pp. iv, 71-113, pl. 1. (Reprint, Office of Experiment Stations Bulletin No. 100.)

Features and Water Rights of Yuba River, California. By Marsden Manson, C. E., Ph. D. Pp. iv, 115-154, pls. 3, figs. 4. (Reprint, Office of Experiment Stations Bulletin No. 100.)

Irrigation Investigations on Cache Creek. By J. M. Wilson, C. E., Agent and Expert, Irrigation Investigations. Pp. iv, 155-191, pls. 8. (Reprint, Office of Experiment Stations Bulletin No. 100.)

Report of Irrigation Problems in the Salinas Valley. By Charles D. Marx, Professor of Civil Engineering in Leland Stanford Junior University. Pp. iv, 193-213, pls. 2, figs. 7. (Reprint, Office of Experiment Stations Bulletin No. 100.)

Irrigation from the San Joaquin River. By Frank Soulé, Professor of Civil Engineering in the University of California. Pp. iv, 215-258, pls. 3. (Reprint, Office of Experiment Stations Bulletin No. 100.)

Water Appropriation from Kings River. By C. E. Grunsky, C. E., Civil Engineer of San Francisco. Pp. iv, 259-325, pls. 4, figs. 5. (Reprint, Office of Experiment Stations Bulletin No. 100.)

A Study of Water Rights on the Los Angeles River, California. By Edward M. Boggs, C. E., Consulting Engineer. Pp. iv, 327-351. (Reprint, Office of Experiment Stations Bulletin No. 100.)

Problems of Water Storage on Torrential Streams of Southern California as Typified by Sweetwater and San Jacinto Rivers. By James D. Schuyler, Hydraulic Engineer. Pp. iv, 353-395, pls. 2. (Reprint, Office of Experiment Stations Bulletin No. 100.)



